REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are requested.

Attached hereto is a marked-up version of the pages of the specification and claim to which changes have been made by the current Amendment. The attached pages are captioned ***"Version with Markings to Show Changes Made."***

By this Amendment claim 2 has been amended and claims 3-7 have been added.

In section 2 on page 2 of the Office Action, the Examiner rejected claim 2 under 35 U.S.C. 103(a) as being unpatentable over Masuzawa et al. in view of Sebastian et al. As expressed above, claim 2 has been amended and claims 3-7 have been added. Currently pending claims 2-7 are believed to be allowable over a combination of Masuzawa et al. and Sebastian et al. for the following reasons.

Claim 2 has been amended to recite that the rotor of the permanent magnet motor comprises a cylindrical permanent magnet including

> a **composite block** of plural cylindrical unit permanent magnets...with said plural cylindrical unit permanent magnets being **rotationally fixed** relative to one another.

Such a rotor is not taught or suggested by either one of Masuzawa et al. and Sebastian et al.

In this regard, Masuzawa et al. discloses a motor having permanent magnets, for example magnets 31 and 32 as shown in Figure 1B. However, these permanent magnets 31 and 32 are rotatable relative to one another (column 5, lines 60-66), such that they are **not** "rotationally fixed" relative to one another as recited in claim 2. And, there is no

teaching or suggestion in Masuzawa et al. to modify the permanent magnets 31 and 32 so as to be rotationally fixed or non-rotatable relative to one another.

Additionally, the permanent magnets 31 and 32 include a gap 5 therebetween (column 8, lines 30-35). Because of this gap 5, and because the permanent magnets 31 and 32 are rotatable relative to one another, it is respectfully submitted that it would not be a reasonable interpretation of Masuzawa et al. to construe a combination of permanent magnets 31 and 32 as a "composite block" of plural cylindrical unit permanent magnets, as recited in claim 2.

Neither of the above two features, i.e. the rotor comprising a "composite block" of plural cylindrical unit permanent magnets that are "rotationally fixed" relative to one another, is taught or suggested by Sebastian et al. Accordingly, any combination of Masuzawa et al. and Sebastian et al. would not result in the invention as now recited in claim 2. Thus, claim 2 is not obvious over a combination of Masuzawa et al. and Sebastian et al., whereby claims 2-7 are allowable.

The remaining claims 3-7 recite further features that are not taught or suggested by either one of Masuzawa et al. and Sebastian et al. Accordingly, claims 3-7 are patentable in their own right.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicants' undersigned representative by telephone to resolve such issues.

Respectfully submitted,

Koji SATO et al.

By: Joseph M. Gorski

Joseph M. Gorski
Registration No. 46,500
Attorney for Applicants

JMG/adb
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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small, the cogging torque cannot be substantially decreased by the skew magnetization of the rotor or magnet and, when the skew angle is too large, an undue decrease is caused in the rotation torque of the motor.

[0034] In an alternative definition, the present invention provides a permanent magnet motor which comprises, as an assembly:

(a) a stator having a plurality of stator teeth; and

(b) a rotor coaxially inserted into the stator, which rotor is a monolithic cylindrical permanent magnet having magnetic anisotropy in a single diametrical direction perpendicular to the cylinder axis, and is magnetized to have a plurality of evenly disposed magnetic poles around the circumference of the cylinder. The number of the magnetic poles k of the rotor is an even number not exceeding 100, and the number of the stator teeth n is equal to $3n_0$, with n_0 being a positive integer not exceeding 33, with the proviso that k is not equal to n.

[0035] When a permanent magnet motor satisfies the above described requirements for the rotor and stator, a magnetic pole having a low magnetic flux density is combined in each of the phases with a magnetic pole having a high magnetic flux density, which results in a smooth distribution of the total magnetic flux, as an average, to ensure evenness in the rotation torque of the motor. Accordingly, high-performance synchronous permanent magnet motors with small torque ripples can be manufactured at low costs by using an inexpensive diametrically oriented cylindrical permanent magnet as the rotor.

[0036] It is also optional in this case that the diametrically oriented cylindrical permanent magnet used as the rotor can be provided with skew magnetization, and that the stator can have skewed stator teeth, with a skew angle in the range from one tenth to two thirds of 360°/k, i.e. 360° divided by the number of the magnetic poles.

[0037] In connection with the secondary object of the invention, the present invention provides a rotor in a permanent magnet motor in the form of a composite cylindrical permanent magnet block having an increased height, which comprises at least one assembly of at least two, or preferably, two to ten cylindrical unit permanent magnets coaxial stacked

so as to be rotationally fixed relative to one another

one on the other, with each having magnetic anisotropy in a single diametrical direction perpendicular to the cylinder axis. The composite cylindrical permanent magnet block is provided with multipolar magnetization to have a plurality of magnetic poles around the circumference of the cylindrical block.

[0038] In particular, the above defined composite cylindrical permanent magnet block having an increased height, and to be used as a rotor in a permanent magnet motor, is assembled in such a fashion that the direction of diametrical magnetic orientation of a first cylindrical unit permanent magnet makes a rotational displacement angle, within a plane perpendicular to the cylinder axis and relative to the direction of diametrical magnetic orientation of a second cylindrical unit permanent magnet that is adjacent to the first cylindrical unit permanent magnet of 180° divided by the number of the cylindrical unit permanent magnets stacked together one on the other, assuming that the cylindrical unit permanent magnets each have substantially the same axial dimension or height.

[0039] As is described above, the rotor in a permanent magnet motor provided by the invention to accomplish the secondary object of the invention is a composite cylindrical permanent magnet block, which consists of an assembly of at least two cylindrical unit permanent magnets each having a diametric orientation and coaxially stacked one on the other, and which is provided with multipolar magnetization.

[0040] In the plurality of cylindrical unit permanent magnets coaxial stacked one on the other to form a composite magnet block, the relationship between the direction of diametrical orientation and the direction of multipolar magnetization of one unit magnet can be different from that of the other unit magnets. Taking six-polar magnetization as an exemplary case, one of the unit magnets can be magnetized in such a fashion as is illustrated in Figure 1A, in which the direction of the diametrical orientation in a unit magnet 1, indicated by the double-sided arrow, coincides with the direction connecting a pair of oppositely facing magnetizer coils 12,12 of the magnetizer head 10. The distribution of

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2. A permanent magnet motor comprising:

a stator having [skewed] stator teeth; and

a rotor coaxially inserted within said stator, wherein said rotor comprises a cylindrical permanent magnet including a composite block of plural cylindrical unit permanent magnets, each of said plural cylindrical unit permanent magnets having magnetically anisotropic orientation in a single diametrical direction perpendicular to a cylinder axis of said cylindrical permanent magnet, with each of said plural cylindrical unit permanent [magnet] magnets being magnetized to have evenly disposed magnetic poles around a circumference of said cylindrical permanent magnet, and with said plural cylindrical unit permanent magnets being rotationally fixed relative to one another,

wherein said evenly disposed magnetic poles are k in number, with k being an even integer not smaller than 4 and not greater than 100, and

wherein said stator teeth are n in number, with n being equal to $3n_o$ when n_o is a positive integer not exceeding 33, with the proviso that k is not equal to n.